

WHAT IS CLAIMED IS:

1. An exercise apparatus, comprising:

a frame having a base that is configured to rest upon a floor surface;

5 a front crank rotatably mounted on a forward portion of the frame, wherein the front crank includes a first left connection point, a discrete, second left connection point, a first right connection point, and a discrete, second right connection point;

10 a rear crank rotatably mounted on a rearward portion of the frame, and constrained to rotate together with the front crank;

a left rail movably interconnected between a respective portion of the rear crank and the first left connection point on the front crank;

15 a right rail movably interconnected between a respective portion of the rear crank and the first right connection point on the front crank;

a left foot support and a right foot support, wherein each said foot support is movably mounted on a respective said rail;

20 a left rocker link and a right rocker link, wherein each said rocker link is pivotally mounted on the frame and operatively connected to a respective said foot support;

25 a left drive link movably interconnected between the left rocker link and the second left connection point on the front crank, wherein the left drive link remains generally vertical during rotation of the front crank, and links rotation of the front

crank to both pivoting of the left rocker link and movement of the left foot support along the left rail; and

a right drive link movably interconnected between the right rocker link and the second right connection point on the front crank, wherein the right drive link remains generally vertical during rotation of the front crank, and links rotation of the front crank to both pivoting of the right rocker link and movement of the right foot support along the right rail.

2. The exercise apparatus of claim 1, wherein an angle of approximately sixty degrees is defined between each said first connection point and a respective said second connection point.

3. The exercise apparatus of claim 1, wherein an upper distal end of each said rocker link is sized and configured for grasping.

4. The exercise apparatus of claim 1, wherein each said foot support is a skate that is rollably mounted on a respective rail.

5. The exercise apparatus of claim 1, wherein each said drive link is selectively adjustable along a respective said rocker link.

6. The exercise apparatus of claim 1, wherein a left bearing assembly is disposed between the first left connection point and the second left connection point on the front crank, and a right bearing assembly is disposed between the first right connection point and the second right connection point on the front crank.

7. The exercise apparatus of claim 1, wherein each said first connection point is disposed between left and right front bearing assemblies.

8. The exercise apparatus of claim 1, wherein all points on each said rail are constrained to travel through respective circular paths, and all points on each said foot support are constrained to travel through respective elliptical paths.

9. The exercise apparatus of claim 8, wherein each of said elliptical paths has a respective minor axis that is equal to a diameter defined by the circular paths, and a respective major axis that is relatively longer.

10. The exercise apparatus of claim 1, wherein each said rocker link pivots about a common pivot axis, and each said rocker link includes a tubular portion that extends along the pivot axis, and a handlebar portion that is secured to an outboard end of a respective tubular portion, and an opposite, distal portion that is secured to an opposite, inboard end of a respective tubular portion, and that is linked to a respective foot support.

11. An exercise apparatus, comprising:

20 a frame having a base that is configured to rest upon a floor surface;

a front crank rotatably mounted on a forward portion of the frame for rotation about a front crank axis;

25 a rear crank rotatably mounted on a rearward portion of the frame for rotation about a rear crank axis, and constrained to rotate together with the front crank;

a left rail and a right rail, wherein each said rail is constrained to rotate together with a respective portion of the rear crank and a respective portion of the front crank;

5       a left foot support and a right foot support, wherein each said foot support is movably mounted on a respective said rail;

10      a left rocker link and a right rocker link, wherein each said rocker link is pivotally mounted on the frame for pivoting about a common pivot axis, and each said rocker link includes a first member that extends from the pivot axis to a distal end that is sized and configured for grasping, a second member that extends from the pivot axis to a distal end that is operatively connected to a respective said foot support, and an intermediate third member that angles forward relative to the second member;

15      a left drive link movably interconnected between a respective said third member and a respective portion of the front crank, wherein the left drive link remains generally vertical during rotation of the front crank, and links rotation of the front crank to both pivoting of the left rocker link and movement of the 20 left foot support along the left rail; and

25      a right drive link movably interconnected between a respective said third member and a respective portion of the front crank, wherein the right drive link remains generally vertical during rotation of the front crank, and links rotation of the front crank to both pivoting of a respective said first member and movement of the right foot support along the right rail.

12. The exercise apparatus of claim 11, wherein the respective portion of the front crank that is connected to the left drive link is on a crank disc, and the crank disc is connected to a flywheel by at least one belt.

5       13. The exercise apparatus of claim 12, wherein the crank disc and the left rail are disposed on opposite sides of a bearing assembly.

10      14. The exercise apparatus of claim 11, wherein the respective portion of the front crank that is connected to the right drive link is on a first crank sprocket, and the first crank sprocket is connected to a second crank sprocket by a chain, and the second crank sprocket is part of the rear crank.

15      15. The exercise apparatus of claim 14, wherein the first crank sprocket and the right rail are disposed on opposite sides of a bearing assembly.

16. An exercise apparatus, comprising:

a frame having a base that is configured to rest upon a floor surface;

20      a front crank rotatably mounted on a forward portion of the frame for rotation about a front crank axis;

a rear crank rotatably mounted on a rearward portion of the frame for rotation about a rear crank axis, and constrained to rotate together with the front crank;

25      a left rail and a right rail, wherein each said rail is constrained to rotate together with a respective portion of the rear crank and a respective portion of the front crank;

a left foot support and a right foot support, wherein each said foot support is movably mounted on a respective said rail;

5           a left rocker link and a right rocker link, wherein each said rocker link is pivotally mounted on the frame for pivoting about a common pivot axis, and each said rocker link includes an upper distal end that is sized and configured for grasping, and a lower distal end that is operatively connected to a respective foot support;

10           a left linking means, interconnected between the front crank and the left rocker link, for linking rotation of the front crank to pivoting of the left rocker link and movement of the left foot support relative to the left rail in such a manner that the upper distal end of the left rocker link moves rearward as the left foot support moves forward; and

15           a right linking means, interconnected between the front crank and the right rocker link, for linking rotation of the front crank to pivoting of the right rocker link and movement of the right foot support relative to the right rail in such a manner that the upper distal end of the right rocker link moves rearward as the right foot support moves forward.

20           17. The exercise apparatus of claim 16, wherein each said linking means includes a drive link interconnected between a respective said front crank and a respective said rocker link.

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18. The exercise apparatus of claim 17, wherein each said drive link is adjustably connected to a respective said rocker link.

19. An exercise apparatus, comprising:

5           a frame having a base that is configured to rest upon a floor surface;

              a front crank rotatably mounted on a forward portion of the frame for rotation about a front crank axis;

10          a rear crank rotatably mounted on a rearward portion of the frame for rotation about a rear crank axis, and constrained to rotate together with the front crank;

              a left rail and a right rail, wherein each said rail is constrained to rotate together with a respective portion of the rear crank and a respective portion of the front crank;

15          a left foot support and a right foot support, wherein each said foot support is movably mounted on a respective said rail;

20          a left rocker link and a right rocker link, wherein each said rocker link is pivotally mounted on the frame for pivoting about a common pivot axis, and each said rocker link includes a lower distal end that is operatively connected to a respective foot support;

25          an adjustable left linking means, interconnected between the front crank and the left rocker link, for linking rotation of the front crank to pivoting of the left rocker link and movement of the left foot support relative to the left rail; and

an adjustable right linking means, interconnected between the front crank and the right rocker link, for linking rotation of the front crank to pivoting of the right rocker link and movement of the right foot support relative to the right rail, wherein each  
5 said linking means is adjustable between a first arrangement, wherein a respective said foot support moves through a first elliptical foot path having a first major axis, and a second arrangement, wherein a respective said foot support moves through a second elliptical foot path having a relatively larger, second  
10 major axis with a midpoint that is rearward in comparison to a midpoint associated with the first major axis.

20. An exercise apparatus, comprising:

a frame having a base that is configured to rest upon a floor surface;

15 a front crank rotatably mounted on a forward portion of the frame for rotation about a front crank axis;

a rear crank rotatably mounted on a rearward portion of the frame for rotation about a rear crank axis, and constrained to rotate together with the front crank;

20 a left rail constrained to rotate together with a left portion of the rear crank and a left portion of the front crank, wherein the left portion of the front crank is inboard relative to a left bearing assembly on the frame;

25 a right rail constrained to rotate together with a right portion of the rear crank and a right portion of the front crank,

wherein the right portion of the front crank is inboard relative to a right bearing assembly on the frame;

a left foot support and a right foot support, wherein each said foot support is movably mounted on a respective said rail;

a left rocker link and a right rocker link, wherein each said rocker link is pivotally mounted on the frame for pivoting about a common pivot axis, and each said rocker link includes a lower distal end that is operatively connected to a respective foot support;

a left drive link movably interconnected between the left rocker link and a portion of the front crank that is outboard relative to the left bearing assembly, wherein the left drive link links rotation of the front crank to both pivoting of the left rocker link and movement of the left foot support along the left rail; and

a right drive link movably interconnected between the right rocker link and a portion of the front crank that is outboard relative to the right bearing assembly, wherein the right drive link links rotation of the front crank to both pivoting of the right rocker link and movement of the right foot support along the right rail.